Ref.No. 3388

ONKYO® SERVICE MANUAL

Stereo Power Amplifier

MODEL M-501

UD	120V AC, 60Hz

SAFETY-RELATED COMPONENT WARNING!!
COMPONENTS IDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

ONKYO
AUDIO COMPONENTS

SPECIFICATIONS

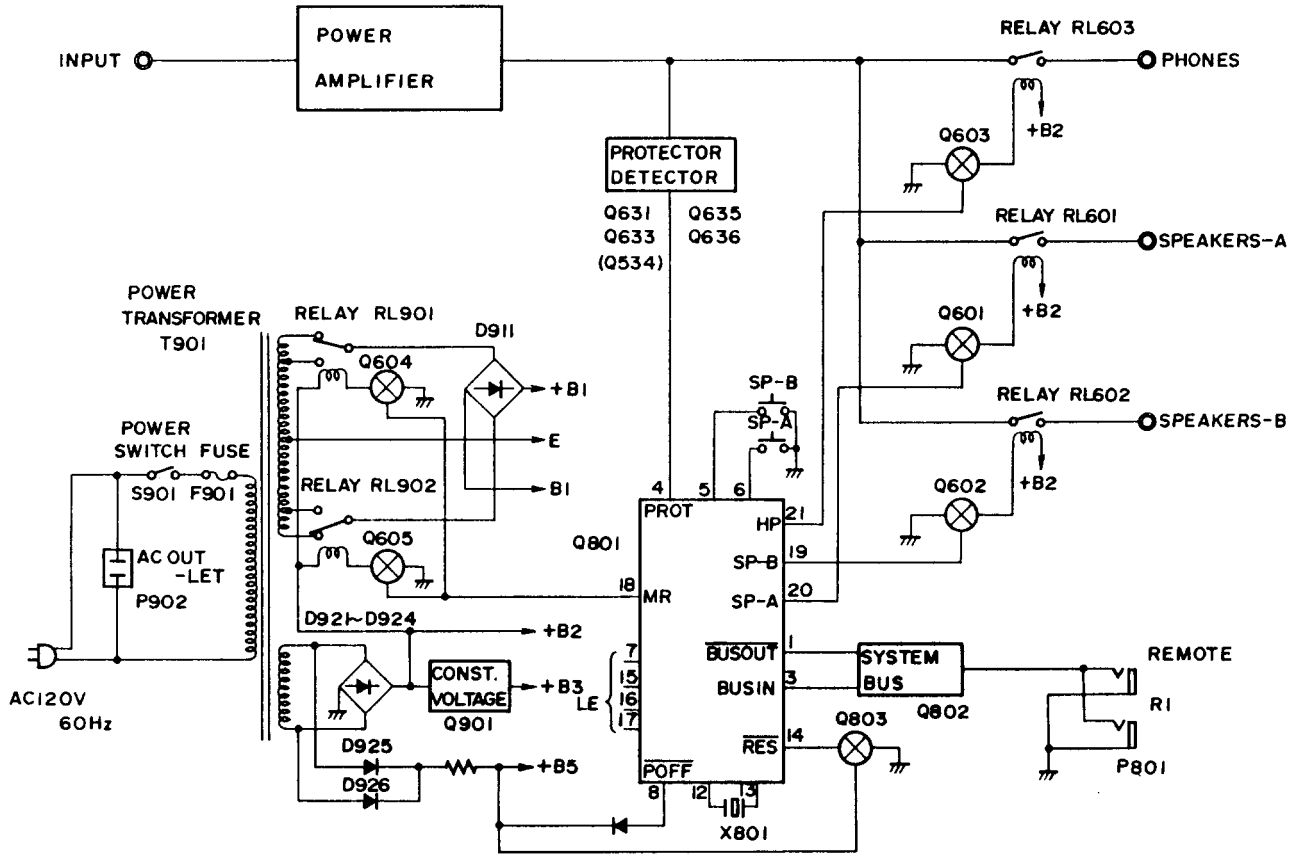
Power Output:	150 watts per channel, min. RMS, at 8 ohms, both channels driven, from 20Hz to 20kHz, with no more than 0.09% THD
Total Harmonic Distortion:	0.09% at 150 watts
IM Distortion:	0.09% at 150 watts
Damping Factor:	60 at 8 ohms
Frequency Response:	5 – 100KHz ±1dB
Sensitivity and Impedance:	1V/50kohms
Signal to Noise Ratio:	100dB (IHFA-202 1 watt output)

General

Power Supply:	AC120V, 60Hz
Dimensions (W × H × D):	455 × 150 × 350mm 17-15/16" × 5-7/8" × 13-3/4"
Weight:	10.5kg, 23.1 lbs.

Specifications and features are subject to change without notice.

BLOCK DIAGRAM



ADJUSTMENT PROCEDURES

Adjustments and Checking the Protection Circuitry

1. Preparations

1) Place the unit on the workbench. (There should be about 15 mm of space between the base plate of the unit and the work surface.)
2) Set up the unit as follows.
   (1) No load
   (2) No signal
   (3) Volume turned all the way down
   (4) Speaker switch OFF
   (5) Power switch OFF

Note) Check the following points before making adjustments
   (1) The power switch should be OFF.
   (2) The interior of the unit should not be warm.

2. Idling current adjustment

1) Turn the power switch ON and allow the unit to warm up for about 10 minutes.
   (1) Adjust R533(R534) so that the voltage at test point VCT-IID on the NAAF-4123circuit board is20mV±5mV.
   Note) Semi-fixed resistors enclosed in parentheses ( ) are for the right channel.

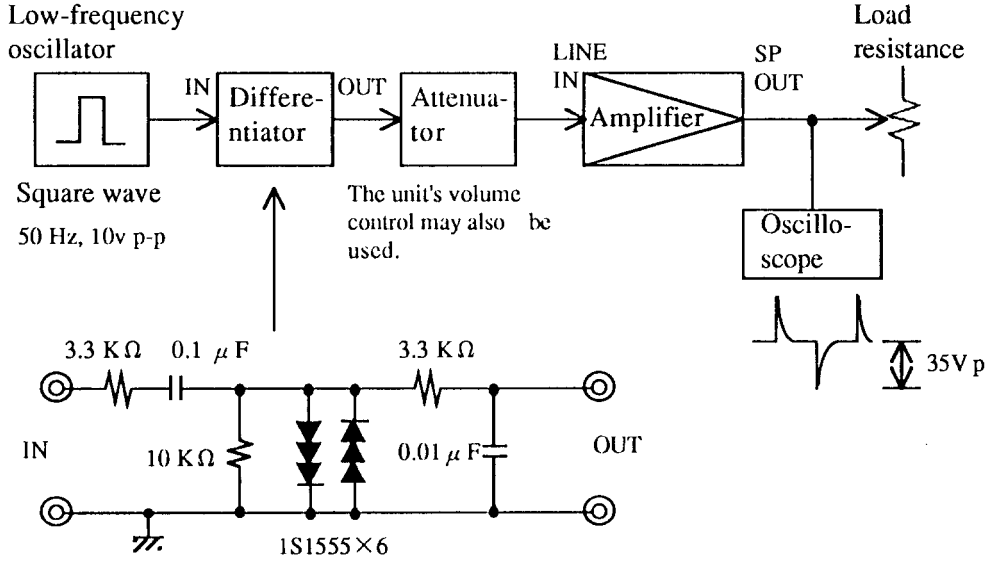
3. Check of operation of protection circuitry

1) Check of operation of protection relay
   (1) Confirm that the relay turns ON approximately 5 seconds after the power switch is turned ON.
   (2) The relay should turn OFF approximately 0.5 seconds after the power switch is turned OFF.
2) Check of DC detection and servo circuitry operation
   (1) Turn the power on with no load.
   (2) After the speaker relay turns ON, apply DC+ 1.5 V to the CD input terminals. Confirm that the relay turns OFF.
   (3) Confirm that operation is the same as (2) above when an input of DC− 1.5 V is applied.

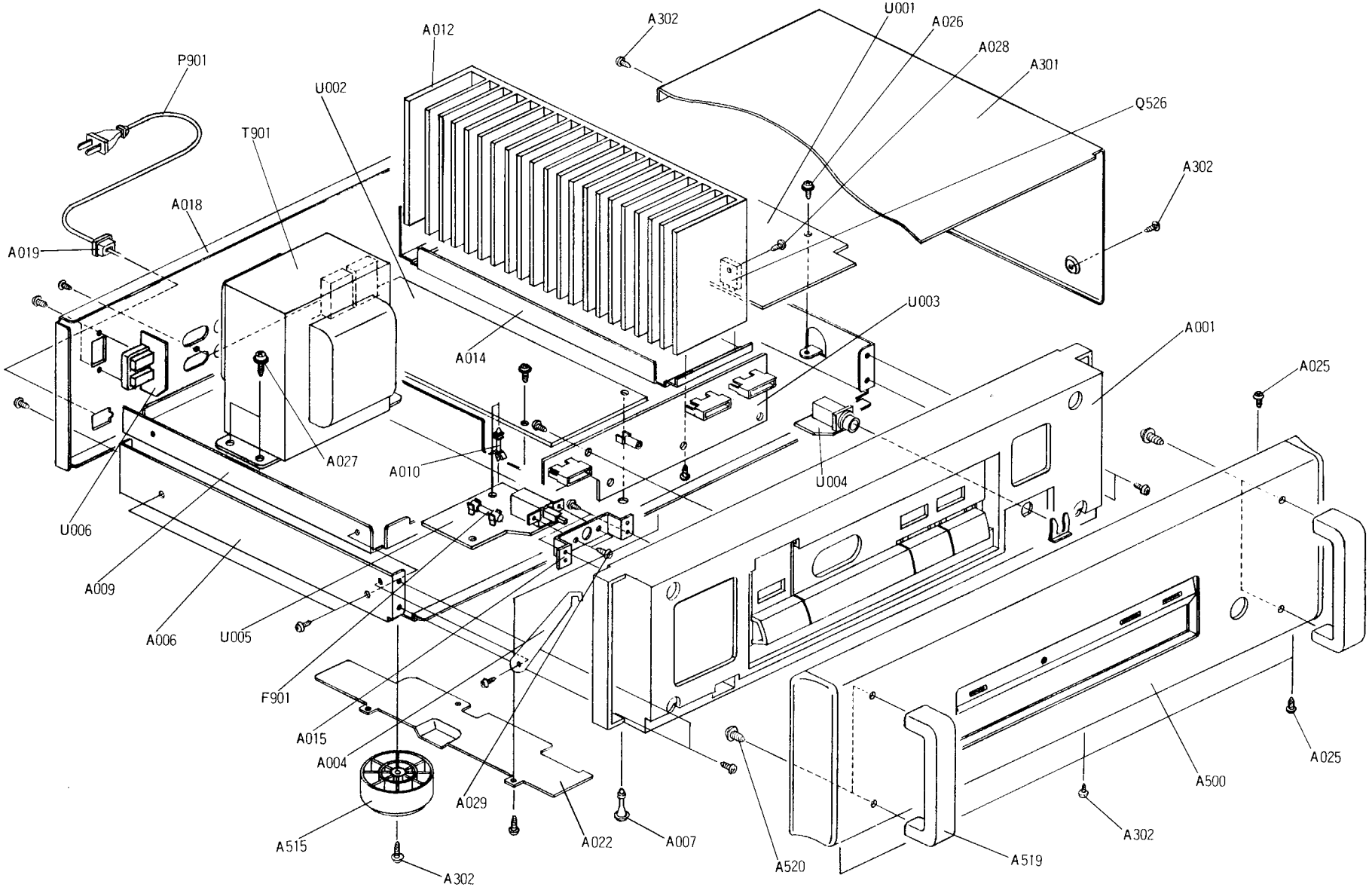
Note) Under no circumstances connect a load or short the speaker terminals when performing the above test.

3) Confirmation of current detection operation.
   (1) In the no-load condition with connections made as shown in the diagram below, input a signal to the set.
   (2) Adjust the input so that the set output is 35V P.
   (3) When a load of 1 ohm is connected to the set, after the speaker relay goes ON-OFF several times, it must hold in the OFF condition.

Note) The period before that relay stays OFF should not last for more than 1 minute.
Relay OFF status can be canceled by switching the power OFF.



CHASSIS-EXPLODED VIEW



CHASSIS-EXPLODED VIEW PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
A001	27110623	FRONT BRACKET ASS'Y
(A001b)	28324255	KNOB
A004	27141478	BRACKET (F)
A006	27100235A	CHASSIS
A007	27190511	KGLS-16RT, HOLDER
A009	27130648A	BRACKET (PT)
A010	27190607	KGLS-16S, HOLDER
A012	27160276A	HEATSINK
A014	27130650	BRACKET (HE)
A015	27141453	BRACKET (POW)
A018	27121414A	BACK PANEL
A019	27300750	BUSHING (CORD)
A022	27170278A	BOTTOM BOARD
A025	834430080	3TTP+8PBC, TAP-TIGHT SCREW
A026	831130088	3TTW+8B, TAP-TIGHT SCREW
A027	830440089	4TTC+8CBC, TAP-TIGHT SCREW
A028	801433	3SHS8WSW+14BBC, SPECIAL TAP-TIGHT SCREW
A029	82143006	3P+6FNBC, PAN HEAD SCREW
A301	28184476	TOP COVER
A302	834430088	3TTS+8BBC, TAP-TIGHT SCREW
A500	1A257121	FRONT PANEL
(A502)	28125234	END CAP (L)
(A503)	28125235	END CAP (R)
(A504)	28140837	CUSHION
(A506)	28324260A	KNOB ASS'Y (GUIDE)
A515	27175251	BOTTOM LEG ASS'Y
A519	28158036	HANDLE
A520	830440109	4TTC+10CBC, TAP-TIGHT SCREW
Q525, Q526	2202203 or	2SC3855A-O or
Q529, Q530	2202204 or	2SC3855A-Y or
	2202206	2SC3855A-P, TRANSISTOR
Q527, Q528	2202213 or	2SA1491A-O or
Q531, Q532	2202214 or	2SA1491A-Y or
	2202216	2SA1491A-P, TRANSISTOR
⚠ T901	2300631	NPT-1099D, POERT TRANSFORMER
⚠ P901	253123 or	AS-UC-6#18, POWER SUPPLY CABLE or
	253136 or	AS-UC-6#18, POWER SUPPLY CABLE or
	253140 or	AS-UC-6#18, POWER SUPPLY CABLE or
	253146	AS-UC-6#18, POWER SUPPLY CABLE
⚠ F901	252052	7A(ST-6) FUSE
U001	1A257523-1	NAAF-4123-1, MAIN PC BOARD ASS'Y
U002	1A257524-1	NAPS-4124-1, POWER SUPPLY CIRCUIT PC BOARD ASS'Y
U003	1A257525-1	NADG-4125-1, MICROPROCESSOR CIRCUIT PC BOARD ASS'Y
U004	1A257526-1	NAETC-4126-1, PHONES TERMINAL PC BOARD ASS'Y
U005	1A257527-1	NASW-4127-1, FUSE PC BOARD ASS'Y
U006	1A257528-1	NAETC-4128-1, AC OUTLET PC BOARD ASS'Y

NOTE:
THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

PACKING PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
A851	29052166A	MASTER CARTON BOX
A852	29091448B	PAD, LEFT
A853	29091449B	PAD, RIGHT
A855	29100033A	750 × 500mm, POLY-VINYL BAG
A856	282301	SEALING HOOK
A857	29110071	DAMPLON TAPE
A871	261504	PAPER TAPE
A868	29360778	LABEL (FLASH) [N]
	ACCESSARY BAG ASS'Y	
A874	29341597	INSTRUCTION MANUAL
A904	29365019A	WARRANTY CARD [N]
A905	29358002J	SERVICE STATION LIST [N]
A875	2010098A	CONNECTION CABLE
A876	2010200	3.5 MINI-PLAG ASS'Y
A870	29100006A	350 × 250mm, POLY-VINYL BAG

NOTE [N]: ONLY U.S.A. MODEL

PRECAUTIONS

1. Replacing the fuses

For continued protection against risk fire, replace only with same type and same rating fuse.

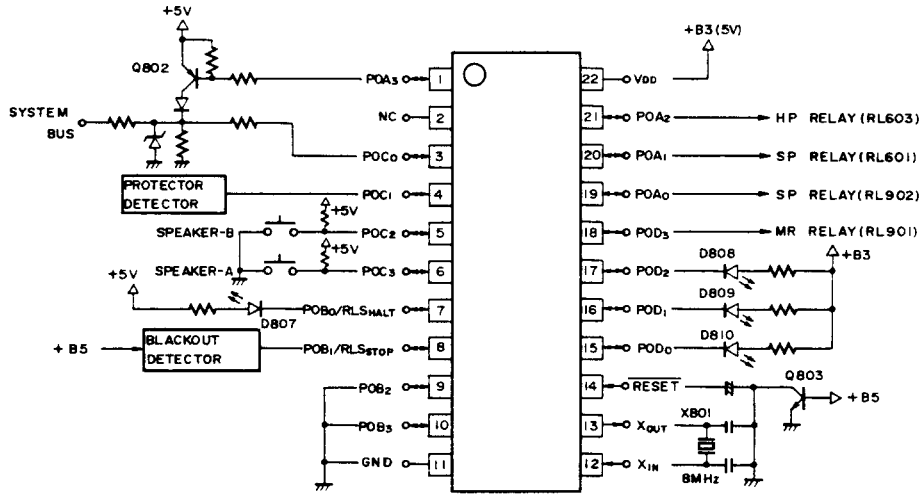
CIRCUIT NO.	PARTS NO.	DESCIRPTION
F901	252052	7A (ST-6), Primary fuse

2. Insulation resistance mesurement

Connect the insulating-resistance tester between the plug of power supply cable and the terminal GND on the back panel. Specifications; More than 10MΩ at 500V.

IC BLOCK DIAGRAM AND DESCRIPTIONS

μPD17104CS



Pin No.	Pin name	Symbol	Function
1	POA3	$\overline{\text{SYS OUT}}$	Output terminal for System Code. Active "L"
2	NC	—	No connectin.
3	POCO	SYS IN	Input terminal for System Code. Active "H".
4	POC1	PROTECT	Input terminal for detecting Protect Operation. Active "H". However, "H" 100μs or under shall be ignored.
5	POC2	$\overline{\text{SPBKEY}}$	Input terminal for SPEAKER-B Key. When pressed SPEAKER-B Key, turned into "L".
6	POC3	$\overline{\text{SPAKER}}$	Input terminal for SPEAKER-A Key. When pressed SPEAKER-A Key, turned into "L".
7	POBO/RLS	$\overline{\text{POWER}}$	Output terminal for POWER display. "L" (POWER Display lighted) will be output at any time.
8	POB1/RLS	$\overline{\text{POFF}}$	Input terminal for detecting power suspension. Active "L". However, "L" 100μs or under shall be ignored.
9	POB2	—	Not to be used. "L" will be output at any time.
10	POB3	—	Not to be used. "L" will be output at any time.
11	GND	GND	GND (Ground) Terminal.
12	XIN	XIN	Terminal for conecting with Ceramic Oscillator (8 MHz).
13	XOUT	XOUT	
14	RESET	$\overline{\text{RESET}}$	System reset terminal. "Active "L".
15	PODO	$\overline{\text{SPB}}$	Output terminal for displaying SPEAKER-B. When turned ON; "L" (lighted).
16	POD1	$\overline{\text{SPA}}$	Output terminal for displaying SPEAKER-A. When turned ON; "L" (lighted).
17	POD2	$\overline{\text{PROIND}}$	Output terminal for PROTECT INDICATOR. Usually, will be output just like HPRL output (lighted when HPRL output is "L").
18	POD3	MR	Output terminal for controlling MULTI ROOM. When turned ON; "H".
19	POAO	SPBRL	Output terminal for controlling SPEAKER-B Relay. When turned ON; "H".
20	POA1	SPARL	Output terminal for controlling SPEAKER-A Relay. When turned ON; "H".
21	POA2	HPRL	Output terminal for controlling HEAD PHONE Relay. When turned ON; "H".
22	V_{DD}	V_{DD}	Power source (+5V) terminal.

PRINTED CIRCUIT BOARD PARTS LIST

MAIN PC BOARD (NAAF-4123-1)-PART LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q501, Q502	2213676 or	2SC3067F or
	2213677	2SC3067G
Q503~Q506	2211455 or	2SA1015GR or
	2213074	2SA933R
Q507, Q508	2211732 or	2SC1845F or
	2211733	2SC1845E
Q509, Q510	2211255 or	2SC1815GR or
Q513, Q514	2211183	2SC1740R
Q635, Q636		
Q511, Q512	2211359	2SA949Y (ONK)
Q519, Q520		
Q515~Q518	2211639	2SC2229Y (ONK)
Q633, Q634		
Q521, Q522	2202034 or	2SD1763AD or
	2202035	2SD1763AE
Q523, Q524	2202024 or	2SB1186AD or
	2202025	2SB1186AE
Q631	2211793	2SA992E or
	2211792	2SA992F
	Diodes	
D505~D510	223163	1SS133
D631	224450513	MTZ5.1C, Zener
	Capacitors	
C501, C502	354781009	10μF 50V, Elect.
C505, C506	354742219	220μF 16V, Elect.
C513, C514	393180227	2.2μF 50V, Elect. (FM)
C531, C532	374794734	0.047μF 63V, Film (TF)
C535~C538	3500109	220μF 80V, Elect.
C635	354790109	1μF 100V, Elect.
C636	354722219	220μF 6.3V, Elect.
	Resistors	
R529, R530	442524704	47Ω, 1/2W, Metal oxide film
R533, R534	5210062	N06HR4.7KBD, Semi fixed
R537, R538	442521614	160Ω, 1/2W, Metal oxide film
R539, R540	442521024	1 kΩ, 1/2W, Metal oxide film
R541, R542	442521014	100Ω, 1/2W, Metal oxide film
R543~R550	442520224	2.2Ω, 1/2W, Metal oxide film
R577, R578		
R551, R552	441620104	1Ω, 1W, Metal oxide film
R557, R558		
R553~R556	4000080	0.47Ω, 5W, Metal plate
R559~R562,		
R573, R574	442520824	8.2Ω, 1/2W, Metal oxide film
R575, R576	442520224	2.2Ω, 1/2W, Metal oxide film
R577, R578		
	Terminal	
P101	25045307	NPJ-2PDBL166
	Bracket	
	27141059	

POWER SUPPLY CIRCUIT PC BOARD (NAPS-4124-1)-PART LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	IC	
Q901	222780565JRC	78M56
	Transistors	
Q601~Q605	2211183	2SC1740R
	Diodes	
D601~D605	223163	1SS133
D911	22380044	RBV-1506
D921~D926	22380046	AM01Z
D930	224450562	MTZ5.6B, Zener
	Coils	
L501, L502	231015	S-0.8C
	Capacitors	
C914, C915	3504236	10000μF 80V, Elect.
C922	354762229	2200μF 35V, Elect.
C923	354744709	47μF 16V, Elect.
C932	354741009	10μF 16V, Elect.
	Resistors	
R581, R582	442520564	5.6Ω, 1/2W, Metal oxide film
R921	442520154	1.5Ω, 1/2W, Metal oxide film
R922	442521614	160Ω, 1/2W, Metal oxide film
R923	442521524	1.5Ωk, 1/2W, Metal oxide film
	Relays	
RL601, R602	25065339	NRL-2P5A-DC24-046
RL603	25065342	NRL-1.25A-DC24-048
RL901, RL902	25065435	NRL-1P10A-DC24-072
	SP terminal	
P501	25060159	NTM-8PDMN085
	Stereo jack	
P801	25045330	NPJ-2PDBL-184
	Radiator	
	27160271	RAD-083

MICROPROCESSOR CIRCUIT PC BOARD (NADG-4125-1)-PART LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q801	22240430	MPD17104CS-518
	Transistors	
Q802	2213510	DTA114ES
Q803	2211183	2SC1740-R
	Diodes	
D801, D802	223163	1SS133
D804~D806		
D811		
D803	224450562	MTZ5.6B, Zener
D807~D810	225141	SEL2213C, LED
	Ceramic osc.	
X801	3010154	CST8.00MT
	Capacitors	
C801	3020027	0.047 F, 5V, Super
C803	354741009	10μF 16V, Elect.
C804	354780109	1μF 50V, Elect.
	Holders	
	27190825	(LED)
	27190811	(LED)
	Switch	
S801, S802	25035548	NPS-111-S510

PHONES TERMINAL PC BOARD (NAETC-4126-1)-PART LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Resistors	
R583, R584	441623914	390Ω, 1W, Metal oxide film
	Headphone terminal	
P502	25045255	YKB26-5009

FUSE PC BOARD (NASW-4127-1)-PART LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitor	
⚠ C901	3500065A	0.01μF AC400V/125V, Film (IS)
	Switch	
⚠ S901	25035550	NPS-111-L512P
	Fuseholder	
⚠ F901a	250113	S-N5051

AC OUTLET PC BOARD (NAETC-4128-1)-PART LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	AC outlet	
⚠ P902	25050535	NSCT-2P358T
	Terminal	
	25060092	NTM-1S33

NOTE:
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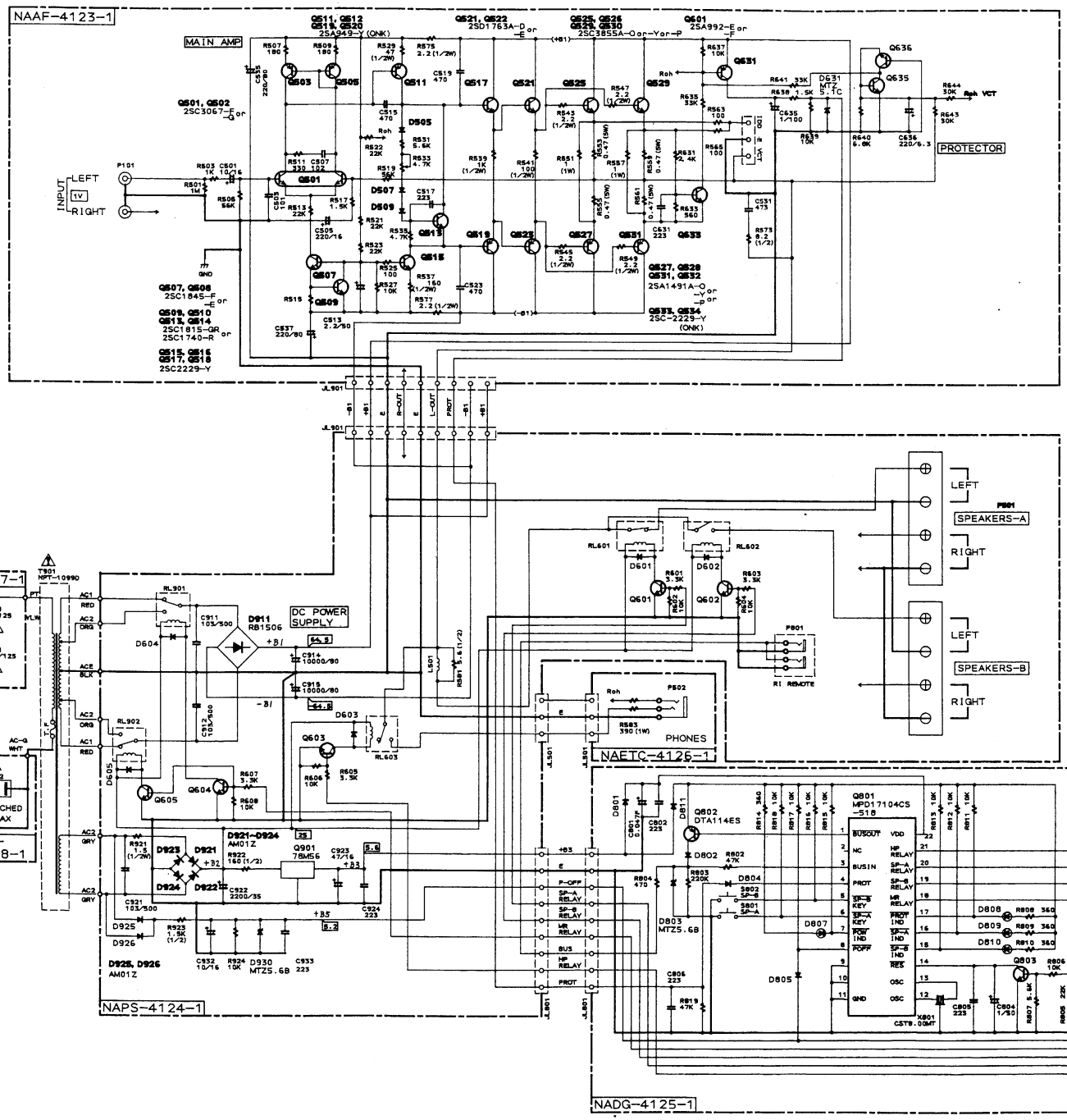
CHEMATIC DIAGRAM

IODEL M-501



NOTE

- THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
- VOLTAGE (MEASURED WITH VOLTMETER) ⊐ IS DC VOLTAGE. (NO INPUT SIGNAL)
- ALL PNP TRANSISTORS ARE EQUIVALENT TO 2SA1015-GR UNLESS OTHERWISE NOTED.
- ALL NPN TRANSISTORS ARE EQUIVALENT TO 2SC1815-GR UNLESS OTHERWISE NOTED.
- ALL DIODES ARE EQUIVALENT TO 1SS133 UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS (◄►) ARE IN μF/WV.
- ALL CAPACITORS ARE IN pF/50WV UNLESS OTHERWISE NOTED. EX) 3pF=030, 33pF=330, 330pF=331, 0.033μF=333
- ALL RESISTORS ARE IN OHMS 1/4 WATTS UNLESS OTHERWISE NOTED.
- THE THICK LINES IN PC BOARD ARE THE PRINTING SIDE OF THE PARTS. EX) ▬▬ PRINTING SIDE
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.